

NOTE ON THE NERVOUS SYSTEM OF *AMPULLARIA*, sp.

By R. H. BURNE, B.A., F.Z.S., etc.

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SINCE I have lately had the opportunity of dissecting the nervous system of *Ampullaria*, sp.,¹ I propose, on account of the ambiguous nature of the relationships of this genus, to point out in the following note the features in which this dissection differs from that described by Bouvier² in his well-known memoir on the nervous system of Prosobranchs.

On p. 90 of the paper quoted, Bouvier describes the pedal ganglia and the nerves issuing from them; he recognizes five main nerves on each side. Three of these, situated on the median side and distributed to the sole of the foot, have a peculiar importance. The other two are less marked. They lie external to the three larger nerves, and are distributed to the lateral parts of the foot. This, it will be noticed, is an arrangement that bears no resemblance whatever to the scalariform pedal cords of *Vivipara*—the genus to which, in many respects, *Ampullaria* appears to be most nearly allied.

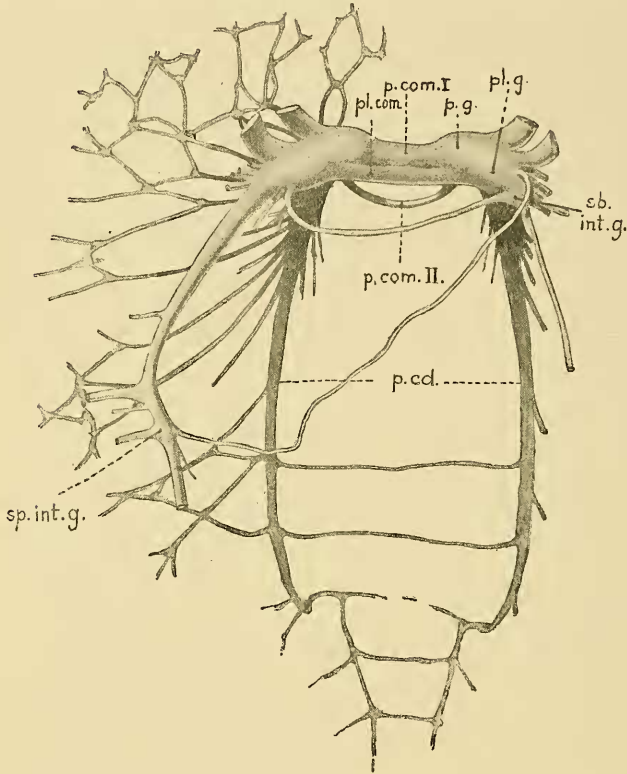
In *Ampullaria*, sp. (*vide* figure), each pedal ganglion sends downwards into the foot a bundle of nerves. One of these far exceeds the others in size. After a short downward course it runs backwards in the substance of the foot, approximating slightly to the median line. In its posterior half it is united to its fellow of the opposite side by a series of four or five very delicate commissures. Lateral and median nerves are given off from the main trunk, especially near its emergence from the pedal ganglion. The lateral nerves, as they approach the margin of the foot, anastomose with one another and also with the extremities of the other nerves that issue directly from the pedal ganglion. In this way the marginal portions of the foot are traversed by an intricate nervous network, with minute ganglionic masses situated at each point where two or more nerves unite. It will be at once noticed that in outward form this pedal nervous system is almost precisely similar to the scalariform cords of *Vivipara*. There is, however, this very essential difference between the two: In *Vivipara* the cords that run longitudinally backwards in the foot and are united at intervals by transverse commissures are ganglionic in nature, and form part of the pedal ganglia; in *Ampullaria* they are without ganglion cells, and thus are simply pedal nerves, issuing as in any of the higher gastropods from anteriorly concentrated pedal ganglia.

¹ Belonging to the Royal College of Surgeons of England.

² Bouvier, "Système nerveux . . . des Gastéropodes Prosobranches": *Ann. Sci. Nat. Zoologie*, sér. vii, tom. iii (1887).

Ampullaria, sp., in this point seems to represent an interesting stage in the anterior concentration of the pedal ganglia, in which, although the outward form of the scalariform pedal ganglion cords is retained, the ganglion cells are already concentrated towards the anterior end, and form definite pedal ganglia.

With regard to the pedal ganglia and their commissure Bouvier says:—"The pedal ganglia are united by a fairly long and very stout



The pleuropedal ganglia and surrounding nerves of *Ampullaria*, sp. (enlarged).

p. com. I. pedal commissure I. *p. com. II.* pedal commissure II. *p. g.* pedal ganglion. *p. cd.* pedal cords. *pl. com.* pleural commissure. *pl. g.* pleural ganglion. *sb. int. g.* subintestinal ganglion. *sp. int. g.* supra-intestinal ganglion.

commissure. They project somewhat in front, and are fused behind with the pallial (pleural) ganglia." This description is applicable enough, as far as it goes, to *Ampullaria*, sp.; but the commissure that unites the pleuropedal ganglion masses is not a simple stout band; on the contrary, it is distinctly separable into three: (1) a broad flat

commissure connecting the pedal ganglia above the pedal artery; (2) a smaller cylindrical commissure connecting the pedal ganglia beneath the pedal artery; and (3) a flat commissure connecting the pleural ganglia. Of these commissures, the first pedal and the pleural lie in the same plane, closely contiguous to one another, and although quite separate at either end, where they respectively emerge from the pleural and pedal parts of the ganglion mass, are united to one another in the middle of their course, and at this point show their individuality only by a superficial furrow. The second pedal commissure rises from the ventral surface of the pedal ganglia, and takes a semicircular course from one to the other beneath the pedal artery. From its position this commissure should be the most anterior of the ladder commissures that unite the pedal cords. In other respects the nervous system of *Ampullaria*, sp., corresponds very closely to that of the three species examined by Bouvier.
